

TECHNICAL ASSISTANCE TEAM

SOIL BORING SCREENING
RESULTS: POLYCYCLIC AROMATIC
HYDROCARBON AND
PENTACHLOROPHENOL ANALYSES

AMERICAN CROSSARM AND CONDUIT
CHEHALIS, WASHINGTON

TDD T10-8710-003

REPORT PREPARED BY: ECOLOGY AND ENVIRONMENT, INC
PROJECT MANAGER: JOHN L. ROLAND
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SUBMITTED TO CARL G. KITZ, DEPUTY PROJECT OFFICER
SUPERFUND RESPONSE AND INVESTIGATION SECTION
U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION X
SEATTLE, WASHINGTON

ecology and environment, inc.

101 YESLER WAY SEATTLE, WASHINGTON, 98104, TEL. 206/624-9537
International Specialists in the Environment

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1.0 INTRODUCTION

Analytical screening of 346 soil/sediment samples, collected from borings drilled at American Crossarm and Conduit (ACC), Chehalis, Washington was performed by Ecology and Environment, Inc. (E&E) chemists under Technical Direction Document TDD T10-8710-003, utilizing the FIT support base laboratory in Seattle, WA. Samples were screened for pentachlorophenol (PCP) and polycyclic aromatic hydrocarbons (PAHs) to support the Technical Assistance Team (TAT) in site characterization. In addition, 54 quality control samples were analyzed for PCP and 57 quality control samples were analyzed for PAHs to monitor analytical method performance and to insure data validity.

Samples were screened for pentachlorophenol and the following polycyclic aromatic hydrocarbons:

Naphthalene	Chrysene
Acenaphthylene	Benzo(a)anthracene
Acenaphthene	Benzo(b)fluoranthene/Benzo(k)fluoranthene
Fluorene	Benzo(a)pyrene
Phenanthrene	Indeno(1,2,3-cd)pyrene/Dibenzo(a,h)anthracene
Anthracene	Benzo(g,h,i)perylene
Fluoranthene	
Pyrene	

2.0 SOIL BORING LOCATIONS AND LOGS

The positions of the 35 borings drilled on site using a rig-mounted hollow stem auger (borings S-00 to S-38) and portable "minute-man" power auger (borings MB-1 through MB-7) are plotted on the two location maps presented in Appendix A. There are no borings labelled S-32, 33, 35, and 36. Map 1 is of the ACC treatment facility area and has the gridding system utilized by the TAT superimposed. Map 2 is of the ACC landfill, which is an area at the south end of the property.

Geologic borehole logs generated during the drilling activities are presented in Appendix B. Total drilling depths ranged from 4 to 44 feet below surface. The average depth was approximately 25 feet. Before abandonment each hole was backfilled to surface with a bentonite chip slurry.

3.0 FIELD SCREENING METHODOLOGY FOR PENTACHLOROPHENOL

3.1 Sample Preparation Method

- 1) Accurately weigh out 2-3 g of sample into a disposable culture tube.
- 2) Add approximately 0.5 g of sodium sulfate.

- 3) Add 10 ml of methanol and mix for two minutes on a vortex mixer.
- 4) Centrifuge the sample for five minutes.
- 5) Place 5 ml of the extract into a clean tube.

3.2 Derivatization Reactant Solution Preparation

- 1) Add 1.0 ml of pentafluorobenzyl bromide (caution - LACRIMATOR!) to a 50 ml volumetric flask.
- 2) Add 1.0 g of hexacyclooctadecane (18-crown-6 ether; caution - TOXIC!).
- 3) Dilute to 50 ml with 2-propanol.

This solution remains active for one week. It should be refrigerated and stored in the dark.

One ml of derivative solution will react with up to 0.3 mg of total phenols.

3.3 Sample Derivatization

- 1) Place 5.0 ml of sample extract into a culture tube.
- 2) Add 1.0 ml of derivative solution
- 3) Add approximately 3 mg of potassium carbonate and gently shake to mix.
- 4) Cap the culture tube and place in a hot water bath at 80°C for four hours (caution - HIGH PRESSURE!)
- 5) After four hours, remove culture tube from bath and allow to cool.
- 6) Add 5 ml of hexane and vortex mix for one minute.
- 7) Add 5 ml of carbon-free water and vortex mix for one minute.
- 8) Transfer the hexane layer to a clean culture tube and add 1 g of sodium sulfate. The sample is now ready for analysis.

3.4 Sample Analysis

The solvent flush injection technique was used for pentachlorophenol analysis. Two ul of nanograde hexane, 1 ul of air, and 2 ul of sample are drawn into a 10 microliter syringe and immediately injected into a Shimadzu GC Mini-2 equipped with an Electron Capture Detector (ECD).

Compound identification was based on retention times compared to those of standards. Since retention times are dependent upon analytical conditions, standards were reanalyzed whenever instrumental changes were made.

3.5 Instrumental Parameters

Instrument: Shimadzu GC-Mini 2 Gas Chromatograph with electron capture detector (ECD)

Integrator: Shimadzu Chromatopac CR-3A Data Processor

Data Storage/
Manipulation: Floppy Disk Drive, FDD-1A; CRT Display Unit

GC Column: Glass, 1 m x 3 mm; 1.5% SP-2250/1.95% SP-2401 on 100/120 Supelcoport

Carrier Gas: 95% argon/5% methane; 40 ml/minute

Injector/Detector
Temperature: 275°C

Oven Temperature: 190°C, isothermal

Injection Volume: 2.0 ul

GC Analysis Time: 20 minutes

3.6 Sample Quantitation

Samples were quantitated using the external standard method. An initial calibration curve was generated using six standard solutions (10, 50, 100, 500, 1000, and 5000 ug/L) to establish detection linearity.

Continuing calibration was performed daily to ensure detection stability. Mid-range p-nitrochlorophenol standards were prepared with each batch of sample. Derivatized. Detector response factors were updated for each batch of samples.

4.0 FIELD SCREENING METHODOLOGY FOR POLYCYCLIC AROMATIC HYDROCARBONS

4.1 Sample Preparation Method

- 1) Accurately weigh 2-3 g of sample into a disposable culture tube.
- 2) Add 6 ml of methylene chloride and mix for 2 minutes on a vortex mixer.
- 3) Centrifuge the tube for 30 minutes.
- 4) Decant the solvent into a clean culture tube.
- 5) Repeat steps 2 through 4 combining the extracts.

- 6) Add a small quantity of anhydrous sodium sulfate to the extract and vortex for 30 seconds.
- 7) Add 2 ml of iso-octane.
- 8) Reduce the solvent volume to approximately 1 ml with gentle heat under a N_2 stream.

4.2 Sample Clean-Up

- 1) Place a small plug of muffle furnace glass wool into a "champagne" column.
- 2) Add 1.75 g of activated silica gel into the column.
- 3) Add a 1 cm layer of anhydrous sodium sulfate on top of the silica gel.
- 4) Rinse the column with 10 ml of methylene chloride and discard the rinsate.
- 5) Rinse the column with 10 ml of petroleum ether and discard the rinsate. Do not allow the column to go dry.
- 6) Add the concentrated sample extract (step 8 above) to the column.
- 7) Rinse the extract culture tube with two 0.5 ml aliquots of iso-octane and add the rinsate to the column.
- 8) Elute the column with 10 ml of petroleum ether and discard the solvent.
- 9) Elute the column with 10 ml of methylene chloride. Collect the first 10 ml of eluted solvent in a graduated centrifuge tube.
- 10) Reduce the solvent volume to under 1 ml with heat under a nitrogen stream.
- 11) Stopper the centrifuge tube. The sample is now ready for analysis.

4.3 Sample Analysis

The solvent flush injection technique was used for polycyclic aromatic hydrocarbon analysis. Two microliters of nanograde methylene chloride, 1 microliter of air, and two microliters of sample were drawn into a 10 microliter syringe and immediately injected into a Shimadzu GC Mini-2 equipped with a flame ionization detector (FID).

Compound identification was based on retention times compared to those of standards. Since retention times are dependent upon analytical

conditions, standards were reanalyzed whenever instrumental changes were made.

4.4 Instrumental Parameters

Instrument: Shimadzu GC Mini-2 gas chromatograph with flame ionization detection (FID).

Integrator: Nelson Analytical PC Integrator with dual channel interface and 20 MB hard disk drive for data storage.

GC Columns: J&W 15 meter x 0.53 mm fused silica megabore capillary with DB-5 phase.
Supelco 30 meter x 0.75 borosilicate megabore capillary with SPB-5 phase.

Carrier Gas: Ultrapure helium; approx. 10 ml/minute.

Injector/
Detector: 330°C

Oven: Initial temperature - hold at 75°C for 2 minutes.
Ramp 15°C /minute.
Final Temp. - hold at 310°C for 7 minutes.

Injection
Volume: 2.0 ul

GC Analysis
Time: 25 minutes

4.5 Sample Quantitation

Samples were quantitated using the external standard method. An initial calibration curve was generated using standard solutions () to establish detector linearity:

Continuing calibration was performed daily to ensure detector stability. Compound response factors and retention times were updated daily.

5.0 FIELD SCREENING DATA RESULTS

Field screening data is not confirmed by mass spectroscopy and, therefore, does not provide the same level of qualitative specificity as CLP data. While field screening data is not equivalent to or a replacement for CLP data, the results presented in this report are self consistent (all samples were extracted and analyzed utilizing the same procedure). Data generated by the E&E Seattle Laboratory for the American Crossarm and Conduit investigation was used to detect site contamination and determine whether further cleanup was required.

Sample results are reported on a wet weight basis. Data are presented in the following tables. The sample numbers are listed in

numerical order and are grouped by borehole identification numbers in Table 1. The depth interval of each sample is also presented.

TABLE 1

**ANALYTICAL RESULTS:
AMERICAN CROSSARM AND CONDUIT,
CHEHALIS, WASHINGTON**

<u>Sample #</u>	<u>Sampled Interval (feet)</u>	<u>Pentachlorophenol (ug/kg)</u>	<u>Total PAH (mg/kg)</u>
S-00			
FS00C1	3.5 - 5.5	-	-
FS00C2	5.5 - 6.0	-	-
FS00E	8.5 - 9	-	-
S-1			
FS1A	0 - 1.5	20,000	-
FS1B	1.5 - 2	1,200	-
FS1C	2 - 3	-	-
FS1D	3 - 3.5	18,000	-
FS1E	3.5 - 4.5	140,000	Trace
FS1F	4.5 - 5.75	120,000	Trace
FS1G	6.5 - 7.5	9,300	Trace
FS1H	9 - 10	4,000	-
FS1I	11.5 - 11.75	18,000	Trace
FS1J	12 - 13	1,100	Trace
FS1K	13.5 - 14	160	-
FS1L	15.5 - 16	140	-
FS1M	16.5 - 18	110	-
FS1N	18 - 19	-	-
FS1O	19.5 - 21	-	-
FS1P	21 - 22.5	-	-
FS1Q	24 - 24.5	-	-

Data Qualifiers:

A dash (-) indicates the material was analyzed for but was not present above the stated detection limit.

Trace indicates the total PAH concentration was between 10 - 100 mg/kg.

PCP Detection Limit: 100 ug/kg

Total PAH Detection Limit: 10 mg/kg

TABLE 1(cont.)

**ANALYTICAL RESULTS:
AMERICAN CROSSARM AND CONDUIT,
CHEHALIS, WASHINGTON**

<u>Sample #</u>	<u>Sampled Interval (feet)</u>	<u>Pentachlorophenol (ug/kg)</u>	<u>Total PAH (mg/kg)</u>
S-2			
FS2A	0 - 2.75	-	-
FS2B	2.75 - 3.25	-	Trace
FS2C	3.5 - 7.5	240,000	Trace
FS2D	7.5 - 8	34,000	-
FS2E	8.5 - 11	1,300	-
FS2F	13.5 - 15	540	-
FS2G	15 - 18	1,800	Trace
FS2H	18 - 18.5	-	-
FS2I	18.5 - 20.5	-	-
FS2J	20.5 - 21.5	460	Trace
FS2K	21.5 - 22	-	-
FS2L	22 - 23	400	Trace
FS2M	23.5 - 26.5	100	Trace
S-3			
FS3A	3.5 - 4	-	Trace
FS3B	4 - 6	230	-
FS3C	13.5 - 15	-	-
FS3D	15 - 26	-	-
FS3E	18.5 - 19.5	-	Trace
FS3F	19.5 - 21.5	-	Trace
FS3G	21.5 - 23.5	-	-
FS3H	23.5 - 25.5	-	-

Data Qualifiers:

A dash (-) indicates the material was analyzed for but was not present above the stated detection limit.

Trace indicates the total PAH concentration was between 10 - 100 mg/kg.

PCP Detection Limit: 100 ug/kg

Total PAH Detection Limit: 10 mg/kg

TABLE 1 (cont.)

**ANALYTICAL RESULTS:
AMERICAN CROSSARM AND CONDUIT,
CHEHALIS, WASHINGTON**

<u>Sample #</u>	<u>Sampled Interval (feet)</u>	<u>Pentachlorophenol (ug/kg)</u>	<u>Total PAH (mg/kg)</u>
S-4			
FS4A	1.5 - 3	-	-
FS4B	3 - 4	1,300	-
FS4C	4.5 - 6	110,000	Trace
FS4D	6 - 7.5	15,000	-
FS4E	7.5 - 9	1,900	Trace
FS4F	9 - 10.5	3,700	-
FS4G	10.5 - 12	2,600	Trace
FS4H	12 - 13.5	1,100	-
FS4I	13.5 - 15	2,900	-
FS4J	15 - 16.5	4,900	-
FS4K	16.5 - 18	380	-
FS4L	18 - 19.5	170	-
FS4M	19.5 - 21	1,000	-
FS4N	21 - 22.5	140	Trace
FS4O	22.5 - 23	-	Trace
FS4P	24 - 25.5	-	-
S-5			
FS5A	0 - 1.4	-	-
FS5B	1.4 - 3.5	-	-
FS5C	3.5 - 4.5	2,100	-
FS5D	4.5 - 7.5	-	-
FS5E	8.5 - 10.5	2,200	-
FS5F	13.5 - 14.5	920	-
FS5G	14.5 - 15.5	660	100
FS5H	(oil collected from auger blades)	21,000	280

Data Qualifiers: A dash (-) indicates the material was analyzed for but was not present above the stated detection limit.

Trace indicates the total PAH concentration was between 10 - 100 mg/kg.

PCP Detection Limit: 100 ug/kg
Total PAH Detection Limit: 10 mg/kg

TABLE 1 (cont.)

**ANALYTICAL RESULTS:
AMERICAN CROSSARM AND CONDUIT,
CHEHALIS, WASHINGTON**

<u>Sample #</u>	<u>Sampled Interval (feet)</u>	<u>Pentachlorophenol (ug/kg)</u>	<u>Total PAH (mg/kg)</u>
S-6			
FS6A	0 - 1.5	-	-
FS6B	1.5 - 2.25	-	-
FS6C	3.5 - 4.75	-	-
FS6D	4.75 - 5.75	-	-
FS6E	8.5 - 10.5	-	-
FS6F	10.5 - 12.5	-	-
S-7			
FS7A	1 - 3	-	-
FS7B	3.5 - 5.5	26,000	Trace
FS7C	8.5 - 10.5	1,400	-
FS7D	13.5 - 16	-	-
FS7E	16 - 17.5	-	-
FS7F	18.5 - 20	-	-
S-8			
FS8A	0 - 3	-	-
FS8B	3 - 3.5	-	-
FS8C	3.5 - 4.5	2,100	Trace
FS8D	4.5 - 6.0	-	-
FS8E	8.5 - 9.5	1,900	Trace
S-9			
FS9A	1.5 - 2.5	-	-
FS9B	3 - 4.5	-	-
FS9C	4.5 - 6	-	-

Data Qualifiers: A dash (-) indicates the material was analyzed for but was not present above the stated detection limit.

Trace indicates the total PAH concentration was between 10 - 100 mg/kg.

PCP Detection Limit: 100 ug/kg
Total PAH Detection Limit: 10 mg/kg

TABLE 1 (cont.)

**ANALYTICAL RESULTS:
AMERICAN CROSSARM AND CONDUIT,
CHEHALIS, WASHINGTON**

<u>Sample #</u>	<u>Sampled Interval (feet)</u>	<u>Pentachlorophenol (ug/kg)</u>	<u>Total PAH (mg/kg)</u>
S-9 cont.			
FS9D	6 - 7.5	-	-
FS9E	7.5 - 8.5	-	-
FS9F	9 - 10.5	-	-
S-10			
FS10A	.5 - 1.5	20,000	-
FS10B	1.5 - 3	1,700	-
FS10C	3.5 - 6.5	75,000	-
FS10D	8.5 - 10.5	420	-
FS10E	10.5 - 11.5	7,400	-
FS10F	13.5 - 14.5	620	Trace
FS10G		-	-
S-11			
FS11A	3 - 4	14,000	Trace
FS11B	4.5 - 5.5	180	-
FS11C	6 - 7.5	100,000	Trace
FS11D	7.5 - 9	8,600	-
FS11E	9 - 10.5	8,400	Trace
FS11F	10.5 - 12	7,600	-
FS11G	12 - 13.25	-	-
FS11H	13.5 - 15	140	Trace
FS11I	15 - 16	-	-
FS11J	16.5 - 16.75	-	Trace
FS11K	18 - 19	-	Trace
FS11L	21 - 22	-	-
FS11M	22.5 - 23.5	-	-
FS11N	25.5 - 26	-	Trace

Data Qualifiers:

A dash (-) indicates the material was analyzed for but was not present above the stated detection limit.

Trace indicates the total PAH concentration was between 10 - 100 mg/kg.

PCP Detection Limit: 100 ug/kg

Total PAH Detection Limit: 10 mg/kg

TABLE 1 (cont.)

**ANALYTICAL RESULTS:
AMERICAN CROSSARM AND CONDUIT,
CHEHALIS, WASHINGTON**

<u>Sample #</u>	<u>Sampled Interval (feet)</u>	<u>Pentachlorophenol (ug/kg)</u>	<u>Total PAH (mg/kg)</u>
S-12			
FS12A	0 - 1.5	110,000	Trace
FS12B	1.5 - 3.5	400,000	210
FS12C	3.5 - 5.5	74,000	Trace
FS12D	5.5 - 6	130,000	Trace
FS12E	12 - 13.5	81,000	1,200
FS12F	13 - 14.5	1,100	Trace
FS12G	18.5 - 20	-	Trace
FS12H		-	Trace
S-13			
FS13A	0 - 1	75,000	Trace
FS13B	1 - 3.5	-	-
FS13C	3.5 - 6.5	1,800	-
FS13D	8.5 - 11	3,400	-
FS13E	13.5 - 16	-	Trace
FS13F	18.5 - 20.5	-	Trace
FS13G	20.5 - 21.5	-	-
FS13H	21.5 - 22.5	-	-
FS13I	23.5 - 25.5	-	-
S-14			
FS14A	1.5 - 2.25	1,100	Trace
FS14B	3.5 - 6	460	-
FS14C	8.5 - 10	1,300	-
FS14D	10 - 11.75	-	-
FS14E	13.5 - 14.5	180	Trace
FS14F	14.5 - 15	180	-

Data Qualifiers:

A dash (-) indicates the material was analyzed for but was not present above the stated detection limit.

Trace indicates the total PAH concentration was between 10 - 100 mg/kg.

PCP Detection Limit: 100 ug/kg

Total PAH Detection Limit: 10 mg/kg

TABLE 1 (cont.)

**ANALYTICAL RESULTS:
AMERICAN CROSSARM AND CONDUIT,
CHEHALIS, WASHINGTON**

<u>Sample #</u>	<u>Sampled Interval (feet)</u>	<u>Pentachlorophenol (ug/kg)</u>	<u>Total PAH (mg/kg)</u>
S-14 cont.			
FS14G	15 - 19.5	-	-
FS14H	18.5 - 19.5	-	-
FS14I	19.5 - 21.5	-	-
FS14J	21.5 - 22.5	-	-
FS14K	23.5 - 25	-	-
FS14L	28.5 - 29	-	-
S-15			
FS15A	0 - 1	44,000	Trace
FS15B	1 - 1.5	440	-
FS15C	1.5 - 3	550,000	Trace
FS15D	3.5 - 6	25,000	Trace
FS15E	8.5 - 11.5	11,000	-
FS15F	13.5 - 16.25	-	-
FS15G	18.5 - 19.75	-	-
FS15H	19.75 - 21	-	-
FS15I	23.5 - 27.5	-	-
S-16			
FS16A	0 - 1	11,000	-
FS16B	1 - 2	630,000	200
FS16C	3.75 - 4.75	14,000	Trace
FS16D	4.75 - 5.5	65,000	Trace
FS16E	8.5 - 11.5	41,000	Trace
FS16F	14. - 14.5	15,000	-
FS16G	18.5 - 19.5	8,300	-
FS16H	23.5 - 26.5	-	-
FS16I	28.5 - 31	140	-

Data Qualifiers: A dash (-) indicates the material was analyzed for but was not present above the stated detection limit.

Trace indicates the total PAH concentration was between 10 - 100 mg/kg.

Pentachlorophenol Detection Limit: 100 ug/kg

Total PAH Detection Limit: 10 mg/kg

TABLE 1 (cont.)

**ANALYTICAL RESULTS:
AMERICAN CROSSARM AND CONDUIT,
CHEHALIS, WASHINGTON**

<u>Sample #</u>	<u>Sampled Interval (feet)</u>	<u>Pentachlorophenol (ug/kg)</u>	<u>Total PAH (mg/kg)</u>
S-17			
EFS17B	2 - 4	47,000	-
FS17C1	4 - 5	62,000	-
FS17C2	5 - 6	370	-
FS17D	6 - 8	270	-
FS17E	8 - 10	930	-
FS17G	12 - 14	2,500	-
FS17H	14 - 16	2,000	-
FS17J	18 - 20	160	-
FS17M	26 - 30	390	-
S-18			
FS18B	2 - 4	3,200,000	1,600
FS18C	4 - 6	110,000	500
FS18D	6 - 8	39,000	Trace
FS18E	8 - 10	4,000	Trace
FS18F	10 - 12	2,200	-
FS18G	12 - 14	15,000	Trace
FS18H	14 - 16	15,000	-
FS18J	18 - 20	780	-
FS18K	20 - 23	1,200	-
FS18L	23 - 26	450	-
S-19			
FS19B	2 - 4	26,000	Trace
FS19C	4 - 6	2,400	Trace
FS19D	6 - 8	5,400	-

Data Qualifiers: A dash (-) indicates the material was analyzed for but was not present above the stated detection limit.

Trace indicates the total PAH concentration was between 10 - 100 mg/kg.

PCP Detection Limit: 100 ug/kg

Total PAH Detection Limit: 10 mg/kg

TABLE 1 (cont.)

**ANALYTICAL RESULTS:
AMERICAN CROSSARM AND CONDUIT,
CHEHALIS, WASHINGTON**

<u>Sample #</u>	<u>Sampled Interval (feet)</u>	<u>Pentachlorophenol (ug/kg)</u>	<u>Total PAH (mg/kg)</u>
S-19 cont.			
FS19F	10 - 12	2,700	Trace
FS19G	12 - 14	1,200	110
FS19J	18 - 20	450	-
FS19L	22 - 24	730	-
S-20			
FS20AA	0 - 2	1,300	-
FS20AB	2 - 4	-	Trace
FS20B	3 - 4	-	Trace
FS20BO	3 - 4	3,200	Trace
FS20CO	4 - 6	4,700	-
FS20EO	8.5 - 10	68,000	Trace
FS20HO	14 - 16	560	-
FS20JO	18 - 20	-	-
FS20LO	23 - 26	-	-
S-21			
FS21A	0 - 2	-	-
FS21AO	0 - 2	-	-
FS21C	4 - 6	-	-
FS21CO	4 - 6	-	-
FS21FO	10 - 12	250	-
FS21GO	12 - 14	-	Trace
FS21HO	14 - 16	-	-
FS21IO	16 - 18	490	-
FS21KO	18 - 20	-	-
FS21LO	23 - 26	-	-

Data Qualifiers: A dash (-) indicates the material was analyzed for but was not present above the stated detection limit.

Trace indicates the total PAH concentration was between 10 - 100 mg/kg.

PCP Detection Limit: 100 ug/kg
Total PAH Detection Limit: 10 mg/kg

TABLE 1 (cont.)

**ANALYTICAL RESULTS:
AMERICAN CROSSARM AND CONDUIT,
CHEHALIS, WASHINGTON**

<u>Sample #</u>	<u>Sampled Interval (feet)</u>	<u>Pentachlorophenol (ug/kg)</u>	<u>Total PAH (mg/kg)</u>
S-22			
FS22A	4 - 5.5	38,000	-
FS22B	4.5 - 6	-	Trace
FS22C	8.5 - 10	92,000	Trace
S-23			
FS23A	0 - 2.5	480	-
FS23B	8.5 - 9.5	-	Trace
FS23C	9.5 - 11.5	-	-
S-24			
FS24C	4 - 6	-	Trace
FS24CO	4 - 6	-	Trace
FS24E	8 - 10	-	Trace
FS24EO	8 - 10	-	Trace
FS24FO	10 - 12	-	Trace
FS24GO	12 - 14	-	-
FS24HO	14 - 16	-	-
FS24IO	16 - 18	-	-
FS24JO	18 - 20	-	Trace
FS24KO	20 - 23	-	-
FS24LO	23 - 26	-	-
FS24MO	26 - 29	-	-
FS24NO	29 - 30.5	-	-

Data Qualifiers: A dash (-) indicates the material was analyzed for but was not present above the stated detection limit.

Trace indicates the total PAH concentration was between 10 - 100 mg/kg.

PCP Detection Limit: 100 ug/kg
Total PAH Detection Limit: 10 mg/kg

TABLE 1 (cont.)

**ANALYTICAL RESULTS:
AMERICAN CROSSARM AND CONDUIT,
CHEHALIS, WASHINGTON**

<u>Sample #</u>	<u>Sampled Interval (feet)</u>	<u>Pentachlorophenol (ug/kg)</u>	<u>Total PAH (mg/kg)</u>
S-25			
FS25C1	4 - 6	-	2,200
FS25C2	4 - 5	-	Trace
FS25C0	5.5 - 6	-	-
FS25F	10 - 12	-	-
FS25G10	12 - 13.5	-	-
FS25G20	13.5 - 14	-	Trace
S-26			
FS26F	10 - 10.5	-	-
FS26H	12 - 15	-	-
FS26I	15 - 18	-	370
FS26J	18 - 20	-	-
FS26K	20 - 23	380	Trace
FS26L	23 - 26	-	-
FS26M	26 - 29	-	-
FS26N	29 - 29.5	450	-
S-27			
FS27A	0 - 3	-	-
FS27B	3 - 4.5	-	Trace
FS27C	4.5 - 7.5	650	-
FS27D	7.5 - 8	-	-
FS27E	8 - 10	12,000	Trace
FS27J1	18 - 18.5	-	-
FS27J2	18.5 - 20	-	-
FS27K	20 - 23	120	-
FS27L	23 - 26	-	Trace
FS27M	26 - 29	-	-

Data Qualifiers: A dash (-) indicates the material was analyzed for but was not present above the stated detection limit.

Trace indicates the total PAH concentration was between 10 - 100 mg/kg.

PCP Detection Limit: 100 ug/kg
Total PAH Detection Limit: 10 mg/kg

TABLE 1 (cont.)

**ANALYTICAL RESULTS:
AMERICAN CROSSARM AND CONDUIT,
CHEHALIS, WASHINGTON**

<u>Sample #</u>	<u>Sampled Interval (feet)</u>	<u>Pentachlorophenol (ug/kg)</u>	<u>Total PAH (mg/kg)</u>
S-28			
FS28C1	3.5 - 4.4	1,600,000	Trace
FS28C	4.4 - 5	450,000	Trace
FS28D	5 - 7	-	-
FS28F	8.5 - 10	-	-
FS28G01	10 - 10.5	-	-
FS28G02	13.5 - 14	-	Trace
FS28J102	18.1 - 18.7	-	Trace
FS28J202	18.7 - 20	-	Trace
FS28K02	20 - 23.5	-	Trace
FS28L02	23.5 - 26.5	380	-
FS28M102	26.5 - 28.5	370	-
FS28M202	28.5 - 29.5	260	Trace
FS28N102	29.5 - 32.5	320	Trace
FS28O02	32.5 - 33.5	320	Trace
FS28P02	32.5 - 35	300	-
S-29			
FS29C	4.5 - 5.5	-	-
FS29E	8 - 10	-	Trace
FS29G	12 - 14	-	Trace
FS29H	14 - 16	-	-
FS29J	18 - 20	-	-
FS29K	20 - 22	-	Trace
FS29L	22 - 24	-	-
FS29M	24 - 26	-	Trace
FS29N	26 - 28	-	Trace
FS29O	28 - 32	-	-

Data Qualifiers: A dash (-) indicates the material was analyzed for but was not present above the stated detection limit.

Trace indicates the total PAH concentration was between 10 - 100 mg/kg.

Detection Limit: 100 ug/kg

PAH Detection Limit: 10 mg/kg

TABLE 1 (cont.)

**ANALYTICAL RESULTS:
AMERICAN CROSSARM AND CONDUIT,
CHEHALIS, WASHINGTON**

<u>Sample #</u>	<u>Sampled Interval (feet)</u>	<u>Pentachlorophenol (ug/kg)</u>	<u>Total PAH (mg/kg)</u>
S-30			
FS30A	0 - 2	-	-
FS30B	2 - 4	-	-
FS30C	4 - 6	-	-
FS30E1	8 - 8.6	-	-
FS30E2	8.6 - 10	-	-
FS30F	10 - 12	-	-
FS30H	14 - 16	-	-
FS30I	16 - 18	-	-
FS30J	18 - 20	-	-
FS30K	20 - 22	-	-
FS30L	22 - 24	-	-
FS30M	24 - 27	-	-
FS30N	27 - 30	-	-
FS30P	33 - 36	-	-
FS30Q	36 - 39	-	-
FS30R	39 - 43	-	-
S-31			
FS31C	4 - 6	600	-
FS31D0	5 - 9	-	-
FS31E	8 - 10	-	-
FS31E0	9 - 10	-	Trace
FS31F	10 - 10.6	-	-
FS31HI	14 - 18	-	Trace
FS31J0	18 - 20	-	-
FS31K0	20 - 23	-	Trace
FS31L0	23 - 26	-	-
FS31N0	29 - 33	-	Trace

Data Qualifiers:

A dash (-) indicates the material was analyzed for but was not present above the stated detection limit.

Trace indicates the total PAH concentration was between 10 - 100 mg/kg.

PCP Detection Limit: 100 ug/kg

Total PAH Detection Limit: 10 mg/kg

TABLE 1 (cont.)

ANALYTICAL RESULTS:
AMERICAN CROSSARM AND CONDUIT,
CHEHALIS, WASHINGTON

<u>Sample #</u>	<u>Sampled Interval (feet)</u>	<u>Pentachlorophenol (ug/kg)</u>	<u>Total PAH (mg/kg)</u>
S-34			
FS34B	2 - 4	-	-
FS34C1	4 - 5	-	-
FS34C2	5 - 6	-	-
FS34E	8 - 10	-	-
FS34F	10 - 12	-	Trace
FS34G	12 - 14	300	Trace
FS34H	14 - 16	-	-
FS34I	16 - 18	-	Trace
FS34J	18 - 20	-	-
FS34K	20 - 23	-	Trace
FS34L	23 - 26	-	Trace
S-37			
FS37A	3 - 4	34,000	Trace
FS37B	4.5 - 5	66,000	Trace
FS37C	6 - 7	31,000	Trace
FS37D	7.5 - 9	11,000	Trace
FS37E	9 - 10	860	Trace
FS37F	10.5 - 11.25	2,900	160
FS37G	12 - 13	760	Trace
FS37H	13.5 - 14.5	660	Trace
FS37I	15 - 16	180	Trace
FS37J	16.5 - 17.5	250	-
FS37K	18 - 19	160	-
FS37L	19.5 - 20	-	-
FS37M	21 - 21.75	-	-
FS37N	22.5 - 24	-	-

Data Qualifiers:

A dash (-) indicates the material was analyzed for but was not present above the stated detection limit.

Trace indicates the total PAH concentration was between 10 - 100 mg/kg.

PCP Detection Limit: 100 ug/kg

Total PAH Detection Limit: 10 mg/kg

TABLE 1 (cont.)

**ANALYTICAL RESULTS:
AMERICAN CROSSARM AND CONDUIT,
CHERHALIS, WASHINGTON**

<u>Sample #</u>	<u>Sampled Interval (feet)</u>	<u>Pentachlorophenol (ug/kg)</u>	<u>Total PAH (mg/kg)</u>
S-38			
(Samples from S-38 were not analyzed)			
MB-1			
MB1A	0 - 1	-	-
MB1B	1 - 2	-	-
MB1C	2 - 3	-	-
MB1D	3 - 4	-	-
MB1E	4 - 5	-	-
MB1F	5 - 6	-	-
MB1G	6 - 7	-	-
MB-2			
MB2A	0 - 1	-	-
MB2B	1 - 2	-	-
MB2C	2 - 3	-	-
MB2D	3 - 4	-	-
MB-3			
MB3A	0 - 2	70,000	Trace
MB3B	2 - 4	37,000	Trace
MB3C	4 - 6	150,000	Trace
MB3D	6 - 8	260,000	580
MB-4			
MB4C2	0 - 2	740,000	-

Data Qualifiers: A dash (-) indicates the material was analyzed for but was not present above the stated detection limit.

Trace indicates the total PAH concentration was between 10 - 100 mg/kg.

PCP Detection Limit: 100 ug/kg
Total PAH Detection Limit: 10 mg/kg

TABLE 1 (cont.)

**ANALYTICAL RESULTS:
AMERICAN CROSSARM AND CONDUIT,
CHEHALIS, WASHINGTON**

<u>Sample #</u>	<u>Sampled Interval (feet)</u>	<u>Pentachlorophenol (ug/kg)</u>	<u>Total PAH (mg/kg)</u>
MB-5			
MB5C1	0 - 2	610,000	Trace
MB5C2	2 - 4	410,000	Trace
MB-6			
MB6A	0 - 2	3,500,000	270
MB6B	2 - 4	920,000	Trace
MB6C	4 - 6	320,000	Trace
MB6D	6 - 8	82,000	-
MB6E	8 - 10	74,000	-
MB-7			
MB7A	0 - 2	26,000	230
MB7B	2 - 4	87,000	970

Data Qualifiers: A dash (-) indicates the material was analyzed for but was not present above the stated detection limit.

Trace indicates the total PAH concentration was between 10 - 100 mg/kg.

PCP Detection Limit: 100 ug/kg

Total PAH Detection Limit: 10 mg/kg

6.0 QUALITY CONTROL/QUALITY ASSURANCE RESULTS

The initial instrumentation set-up followed standard laboratory procedures, which encompasses taking measures to ensure a clean, leak-free GC system.

Nanograde reagents and analytical standards prepared specifically for EPA methods were used for all analyses. Sealed standard and spiking solutions were refrigerated at all times to maintain standard integrity. Standard response was monitored and tracked. Standards were replaced regularly or if response factors indicated deterioration or significant change. Spiking solutions were periodically checked against standards.

All glassware was washed with laboratory detergent, rinsed with deionized and/or carbon-free water and followed by three solvent rinses; methanol, acetone, and hexane. All glassware was covered and stored in a clean environment. Normal field conditions require the analyst to exercise caution in order to avoid contamination and cross-contamination of the analytical equipment, glassware, solvents, standards, samples, and anything else that is used or present in a field screening activity.

6.1 Pentachlorophenol Analysis QA/QC

6.1.1 Method Blanks

Blanks were run a minimum of once per batch of samples derivatized. Empty sample vials were carried through the entire procedure for each matrix-type analyzed.

Laboratory blanks showed no evidence of pentachlorophenol contamination at levels above the estimated instrumental detection limit (approximately 100 ug/kg).

6.1.2 Matrix Spike Results

Accuracy is defined as the closeness to which analytical results approach the true value. Although it is not possible to ensure absolute accuracy for environmental samples, spiked sample analyses provide a measure of extraction efficiency and sensitivity, and thus, indirectly, the accuracy.

A minimum of one spiked sample was analyzed with each batch of samples. Samples were spiked with pentachlorophenol standards of known concentration dissolved in methanol. The results are summarized in Table 2.

TABLE 2
Matrix Spike Analytical Results
(in mg/kg - wet weight)

<u>Sample</u>	<u>Date</u>	<u>Spike Conc.</u>	<u>Sample Result*</u>	<u>Spiked Sample Results</u>	<u>% Recovery</u>
FS21G0	10-29-87	2500	0	1000	40%
FS30J	11-1-87	2500	0	1514	61%
FS24NO	11-2-87	2500	0	1372	55%
FS28L02	11-3-87	2500	384	1544	46%
FS18J	11-6-87	2500	782	3258	99%
FS290	11-8-87	2500	0	3814	152%
FS34L	11-9-87	2500	41	3021	119%
MB1C	11-10-87	2500	0	2190	88%
FS3B	11-10-87	2500	230	1254	41%
FS7E	11-10-87	2500	0	1784	71%
FS2A	11-11-87	25,000	12	15,100	60%
FS23A	11-11-87	2500	480	2180	68%
FS13B	11-12-87	25,000	0	16,650	67%
FS15I	11-25-87	2500	0	1890	76%
FS10E	11-30-87	2500	7400	7900	20%
MB07A	11-30-87	2500	26,000	39,000	**
FS10	12-2-87	2500	52	843	32%
FS12D	12-8-87	2500	130,000	190,000	**
FS37E	12-8-87	2500	860	5,000	165%
FS37M	12-9-87	2500	0	1400	56%

* A value of 0 has been assigned for samples in which no pentachlorophenol was found above the detection limit.

** Sample concentration was greater than 4 times spiked concentration.

6.1.3 Replicate Sample Analysis

Replicate analyses were used to evaluate analytical precision within a data set.

Precision is defined as the tendency for replicate results to exhibit grouping about a central "point." In field screening, precision is primarily a function of sample size and homogeneity. The inherent limitations of field screening generally preclude the analyst's obtaining replicate samples with identical matrices which are required for precision to have true statistical significance for analysis. Precision in field screening includes a sampling error component that cannot be avoided.

Aqueous sample soils with uniform grain size yield higher precision data since they can be taken to assure sample homogeneity. Other indeterminate errors may be minimized by employing good, standard analytical technique.

Replicate sample analyses were performed, at a minimum, once per batch of samples and are summarized in Table 3.

TABLE 3
Replicate Sample Analytical Results
(in mg/kg - wet weight)

<u>Sample</u>	<u>Date</u>	<u>Replicate*</u>		<u>RPD</u>
		<u>#1</u>	<u>#2</u>	
FS21C0	10-30-87	41	26	45% **
FS30J	10-30-87	0	0	0% **
FS27B	11-2-87	0	0	0% **
FS28L02	11-4-87	384	391	1.8% **
FS19B	11-6-87	25,900	2,200	168%
FS31C	11-8-87	600	300	54%
FS34B	11-9-87	52	42	21% **
MB1C	11-10-87	0	0	0% **
FS7E	11-10-87	0	0	0% **
FS3B	11-10-87	350	230	41% **
FS2A	11-11-87	0	24	- **
FS23A	11-11-87	480	890	60%
FS13B	11-13-87	74	0	- **
FS15I	11-25-87	0	0	0% **
FS4I	11-30-87	8,700	2900	100%
MB07A	11-30-87	20,000	26,000	26%
FS10	12-2-87	52	29	57% **
FS11N	12-7-87	0	0	0%
FS37A	12-8-87	34,000	20,000	51%
FS37L	12-8-87	0	0	0% **

* A value of 0 has been assigned for samples in which no pentachlorophenol was found.

** Concentration was less than 4 times the lower limit of detection (LLD). Quality control limit is \pm LLD.

6.2 Polycyclic Aromatic Hydrocarbon Analysis QA/QC

6.2.1 Method Blanks

Blanks were run a minimum of once every 20 samples. Empty sample vials were carried through the entire procedure for each matrix-type analyzed.

Laboratory blanks showed no evidence of PAH contamination at levels above the estimated instrumental detection limit (approximately 10 mg/kg). The results are summarized in Table 4.

TABLE 4
Polycyclic Aromatic Hydrocarbon
Method Blank Analytical Results
(in mg/kg - wet weight)

Sample	Date	Compound	Spike Conc.	Sample Result	Spiked Sample Result	% Recovery
MB1E	10-19-87	Acenophthylene	5	0	3.7	73%
		Phenanthrene	5	0	2.7	55%
		Fluoranthene	5	0	2.6	53%
		Benzo(a)pyrene	5	0	3.4	68%
		Benzo(g,h,i)perylene	5	0	4.3	86%
FS18J	10-20-87	Acenophthylene	12.5	0	3.6	29%
		Phenanthrene	12.5	0	3.0	24%
		Pyrene	12.5	0	2.5	20%
		Benzo(a)pyrene	12.5	0	4.5	36%
		Benzo(g,h,i)perylene	12.5	0	3.2	25%
FS19G	10-21-87	Naphthalene	100	0	99	99%
		Acenophthylene	200	0	221	110%
		Acenophthene	100	12	105	93%
		Fluorene	20	8.2	21	64%
		Phenanthrene	10	0	10	100%
		Anthracene	10	0	10	100%
		Fluoranthene	20	0	23	115%
		Pyrene	10	0	11	110%
		Chrysene	10	0	9.8	98%
		Benzo(a)anthracene	10	0	9.3	93%
		Benzo(a,k)fluoranthene	20	82	20	
		Benzo(a)pyrene	10	8.6	8.3	
		Indeno(1,2,3-cd)pyrene/	30	0	18	60%
		Dibenzo(a,b)anthracene				
		Benzo(g,h,i)perylene	20	0	16	80%
FS30J	10-23-87	Acenophthylene	12.5	0	9.0	72%
		Phenanthrene	12.5	0	6.6	53%
		Fluoranthene	12.5	0	7.7	62%
		Benzo(a)pyrene	12.5	0	15	120%
		Benzo(g,h,i)perylene	12.5	1.2	9.3	65%
FS21F0	10-23-87	Acenophthylene	12.5	0.4	8.4	64%
		Phenanthrene	12.5	0	7.2	58%
		Fluoranthene	12.5	0	7.4	59%
		Benzo(a)pyrene	12.5	0.7	12	90%
		Benzo(g,h,i)perylene	12.5	2.3	8.8	52%
FS24ND	10-27-87	Acenophthylene	12.5	0	6.2	50%
		Phenanthrene	12.5	0	5.4	43%
		Fluoranthene	12.5	0.5	6.5	48%
		Benzo(a)pyrene	12.5	0	4.1	33%
		Benzo(g,h,i)perylene	12.5	0	2.1	17%
FS290	10-27-87	Naphthalene	100	0	48	48%
		Acenophthylene	200	0	129	65%
		Acenophthene	100	0.5	63	63%
		Fluorene	20	0	13	65%
		Phenanthrene	10	0	5.9	59%
		Anthracene	10	0	6.8	68%
		Fluoranthene	20	0.7	17	82%
		Pyrene	10	0	7.7	77%
		Chrysene	10	0	6.5	65%
		Benzo(a)anthracene	10	0	10	100%
		Benzo(a,k)fluoranthene	30	0	20	67%

* A value of 0 has been assigned for samples in which no PAHs were detected.
 ** Sample concentration was greater than 4 times spiked concentration.
 *** Apparent misidentification integration.

TABLE 4

**Polycyclic Aromatic Hydrocarbon
Method Blank Analytical Results
(in mg/kg - wet weight)**

Sample	Date	Compound	Spike Conc.	Sample Result	Spiked Sample Result	% Recovery
FS290	10-27-87	Benzo(a)pyrene	10	0	9.7	97%
		Indeno(1,2,3-cd)pyrene/ Dibenzo(a,b)anthracene	30	0	29	97%
		Benzo(g,h,i)perylene	20	0	20	100%
FS34L	10-30-87	Acenophthylene	12.5	0	7.1	57%
		Phenanthrene	12.5	0	5.4	43%
		Fluoranthene	12.5	0	6.7	54%
		Benzo(a)pyrene	12.5	0	8.7	70%
		Benzo(g,h,i)perylene	12.5	0	13.8	110%
FS28L02	11-6-87	Naphthalene	100	0	86	86%
		Acenophthylene	200	0	201	100%
		Acenophthene	100	0	101	101%
		Fluorene	20	0	19.6	98%
		Phenanthrene	10	0	9.6	96%
		Anthracene	10	0.1	9.3	93%
		Fluoranthene	20	0.9	17.7	84%
		Pyrene	10	0.4	9.7	93%
		Chrysene	10		7.3	73%
		Benzo(a)anthracene	10	5.2	11.4	63%
		Benzo(a,k)fluoranthene	30	0.4	33	109%
		Benzo(a)pyrene	10	0.2	9.8	96%
		Indeno(1,2,3-cd)pyrene/ Dibenzo(a,b)anthracene	30	0.8	23	74%
		Benzo(g,h,i)perylene	20	0	23.5	118%
FS2A	11-10-87	Naphthalene	100	0	54	54%
		Acenophthylene	200	0	170	85%
		Acenophthene	100	0	85	85%
		Fluorene	20	0	17	85%
		Phenanthrene	10	0	7.3	73%
		Anthracene	10	0	9.4	94%
		Fluoranthene	20	0.5	16	73%
		Pyrene	10	1.7	9.0	70%
		Chrysene	10	0	7.0	106%
		Benzo(a)anthracene	10	0	10.6	93%
		Benzo(a,k)fluoranthene	30	0	28	87%
		Benzo(a)pyrene	10	0	8.4	87%
		Indeno(1,2,3-cd)pyrene/ Dibenzo(a,b)anthracene	30	0	26	87%
		Benzo(g,h,i)perylene	20	0	19	95%
FS13B	11-11-87	Naphthalene	100	0	86	86%
		Acenophthylene	200	0	200	100%
		Acenophthene	100	0	99	99%
		Fluorene	20	0	18	90%
		Phenanthrene	10	0	7.8	78%
		Anthracene	10	0	8.8	88%
		Fluoranthene	20	1.8	17.6	79%
		Pyrene	10	0	9.2	92%
		Chrysene	10	0	7.0	70%
		Benzo(a)anthracene	10	3.2	10	68%
		Benzo(a,k)fluoranthene	30	0.5	28	92%
		Benzo(a)pyrene	10	0	8	80%
		Indeno(1,2,3-cd)pyrene/ Dibenzo(a,b)anthracene	30	0	23	77%
		Benzo(g,h,i)perylene	20	0	17	85%

- * A value of 0 has been assigned for samples in which no PAHs were detected.
 ** Sample concentration was greater than 4 times spiked concentration.
 *** Apparent misidentification integration.

TABLE 4
Polycyclic Aromatic Hydrocarbon
Method Blank Analytical Results
(in mg/kg - wet weight)

Sample	Date	Compound	Spike Conc.	Sample Result	Spiked Sample Result	% Recovery
FS15I	11-11-87	Naphthalene	100	0	49	49%
		Acenophthylene	200	0	190	95%
		Acenophthene	100	0	97	97%
		Fluorene	20	0	19.6	98%
		Phenanthrene	10	0	8.6	86%
		Anthracene	10	0.15	9.8	96%
		Fluoranthene	20	0.2	17.7	88%
		Pyrene	10	0.4	10.1	97%
		Chrysene	10	2.4	7.1	47%
		Benzo(a)anthracene	10	2.4	12.6	102%
		Benzo(a,k)fluoranthene	30	0.6	31.4	103%
		Benzo(a)pyrene	10	0.8	9.0	82%
		Indeno(1,2,3-cd)pyrene/	30	0.5	20.2	66%
		Dibenzo(a,b)anthracene				
		Benzo(g,h,i)perylene	20	0	20.3	101%
MB07A	11-25-87	Naphthalene	100	0	70	70%
		Acenophthylene	200	0	189	94%
		Acenophthene	100	0	99.6	99%
		Fluorene	20	0	29	145%
		Phenanthrene	10	0	29	290%
		Anthracene	10	0	13	130%
		Fluoranthene	20	0	73	365%
		Pyrene	10	0	66	660%
		Chrysene	10	0.5	39	385%
		Benzo(a)anthracene	10	1.2	25	238%
		Benzo(a,k)fluoranthene	20	6.4	35	143%
		Benzo(a)pyrene	10	1.9	7.5	56%
		Indeno(1,2,3-cd)pyrene/	30	5.0	39.6	115%
		Dibenzo(a,b)anthracene				
		Benzo(g,h,i)perylene	20	4.1	17	64%
FS10	11-30-87	Naphthalene	100	0	10.8	10.8%
		Acenophthylene	200	0	171	86%
		Acenophthene	100	0	80	80%
		Fluorene	20	0	16.8	84%
		Phenanthrene	10	0.2	8.2	80%
		Anthracene	10	0	8.1	81%
		Fluoranthene	20	2.0	18.9	84%
		Pyrene	10	0.3	9.5	92%
		Chrysene	10	4.6	6.5	19%
		Benzo(a)anthracene	10	0	11.0	110%
		Benzo(a,k)fluoranthene	20	1.1	31.0	150%
		Benzo(a)pyrene	10	0.6	10.0	94%
		Indeno(1,2,3-cd)pyrene/	30	0	20.7	69%
		Dibenzo(a,b)anthracene				
		Benzo(g,h,i)perylene	20	0	21.1	106%
FS12D	12-02-87	Naphthalene	100	0.2	70.1	70%
		Acenophthylene	200	1.8	174	86%
		Acenophthene	100	1.4	63	62%
		Fluorene	20	3.1	18.3	76%
		Phenanthrene	10	4.7	8.1	34%
		Anthracene	10	0	2.3	23%
		Fluoranthene	20	2.3	10.9	43%
		Pyrene	10	3.2	13.5	103%

* A value of 0 has been assigned for samples in which no PAHs were detected.

** Sample concentration was greater than 4 times spiked concentration.

*** Apparent misidentification or integration.

TABLE 4

**Polycyclic Aromatic Hydrocarbon
Method Blank Analytical Results
(in mg/kg - wet weight)**

Sample	Date	Compound	Spike Conc.	Sample Result	Spiked Sample Result	% Recovery
FS12D	12-02-87	Chrysene	10	0.5	13.8	133%
		Benzo(a)anthracene	10	6.9	8.6	17%
		Benzo(a,k)fluoranthene	20	0	17.7	88%
		Benzo(a)pyrene	10	0.3	6.8	57%
		Indeno(1,2,3-cd)pyrene/	30	1.0	16.8	53%
		Dibenzo(a,b)anthracene				
FS10E	12-02-87	Benzo(g,h,i)perylene	20	0	10.1	
		Naphthalene	100	0	55	55%
		Acenophthylene	200	0.4	179	89%
		Acenophthene	100	0	74	74%
		Fluorene	20	0	14.2	71%
		Phenanthrene	10	0.8	6.4	56%
		Anthracene	10	0.8	7.2	64%
		Fluoranthene	20	12.7	14.7	10%
		Pyrene	10	3.1	8.1	50%
		Chrysene	10	0.9	5.1	42%
		Benzo(a)anthracene	10	11	5.6	-54%
		Benzo(a,k)fluoranthene	20	0.2	24.5	122%
		Benzo(a)pyrene	10	0	7.5	75%
		Indeno(1,2,3-cd)pyrene/	30	0.9	19.5	62%
		Dibenzo(a,b)anthracene				
		Benzo(g,h,i)perylene	20	0	13.5	68%
FS37E	12-03-87	Naphthalene	100	0	36.	36%
		Acenophthylene	200	0	228	114%
		Acenophthene	100	0	87	87%
		Fluorene	20	0	18.5	92%
		Phenanthrene	10	0.2	10.8	106%
		Anthracene	10	0	8.6	86%
		Fluoranthene	20	2.9	20.9	90%
		Pyrene	10	0.8	10.7	99%
		Chrysene	10	1.2	8.9	77%
		Benzo(a)anthracene	10	4.5	11.3	68%
		Benzo(a,k)fluoranthene	20	2.3	33.5	156%
		Benzo(a)pyrene	10	1.6	9.7	81%
		Indeno(1,2,3-cd)pyrene/	30	0	30.7	102%
		Dibenzo(a,b)anthracene				
		Benzo(g,h,i)perylene	20	0.2	20.7	102%
FS37M	12-04-87	Naphthalene	100	0	8.6	8.6%
		Acenophthylene	200	0.3	184	92%
		Acenophthene	100	0	77	77%
		Fluorene	20	0	15.6	78%
		Phenanthrene	10	0	7.4	74%
		Anthracene	10	0	8.8	88%
		Fluoranthene	20	1.8	19.6	89%
		Pyrene	10	0.2	9.6	94%
		Chrysene	10	3.1	6.0	29%
		Benzo(a)anthracene	10	3.0	11.3	83%
		Benzo(a,k)fluoranthene	20	0	27.7	138%
		Benzo(a)pyrene	10	0	9.6	96%
		Indeno(1,2,3-cd)pyrene/	30	0	30.9	103%
		Dibenzo(a,b)anthracene				
		Benzo(g,h,i)perylene	20	0	21.4	107%

* A value of 0 has been used for samples in which no PAHs were detected.

** Sample concentration is greater than 4 times spiked concentration.

*** Apparent misidentification or integration.

6.2.2 Matrix Spike Results

A minimum of one spiked sample analysis was performed for each 20 samples. Samples were spiked with PAH standards of known concentration dissolved in methylene chloride/methanol.

6.2.3 Replicate Sample Analysis

Replicate sample analyses were performed at a minimum, on 5% of a sample set. The results are summarized in Table 5.

TABLE 5

Replicate Sample Analytical Results (in mg/kg - wet weight)

Sample	Date	Replicate*		RPD
		#1	#2	
FS30J	10-23-87	0	0	**
FS31C	10-29-87	0	0	**
FS27B	10-29-87	1.0	17	**
FS34B	10-30-87	0	0	**
FS28L02	11-6-87	5	11	**
FS23A	11-6-87	5	8	**
FS3B	11-7-87	4.2	2.8	**
FS7E	11-9-87	9.6	10.0	**
FS2A	11-10-87	2.2	14	**
FS13B	11-10-87	5.5	6.9	**
FS15I	11-12-87	3.9	6.7	*
MB07A	11-25-87	231	229	0.9%
FS10	11-30-87	8.9	7.8	**
FS11N	12-1-87	11	11	**
FS4I	12-1-87	8.3	2.9	**
FS37A	12-2-87	20	37	**
FS37L	12-4-87	7.8	5.0	**

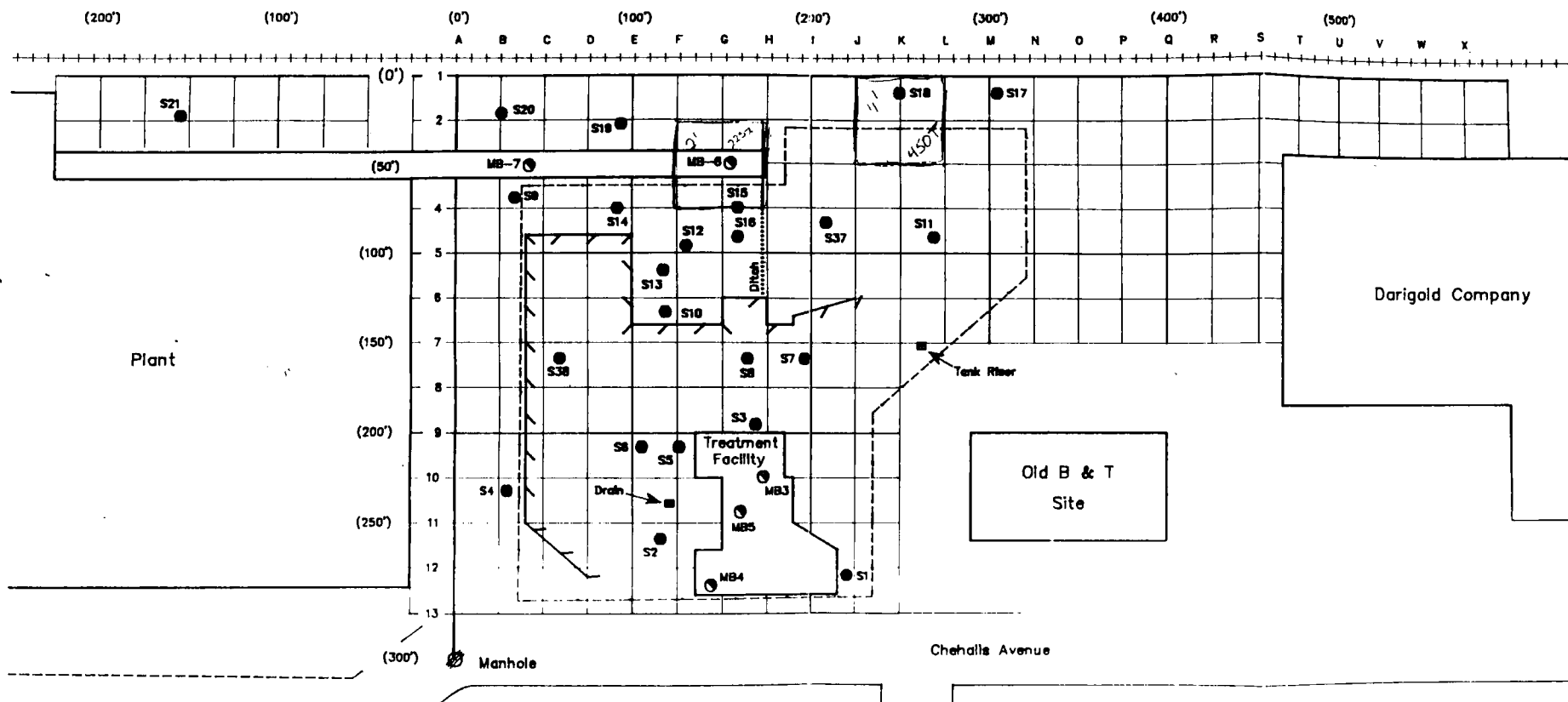
-
- * A value of 0 has been assigned for samples in which no pentachlorophenol was found.
- ** Concentration was less than 4 times the lower limit of detection (LLD). Quality control limit is \pm LLD.

APPENDIX A

Soil Boring Location Maps

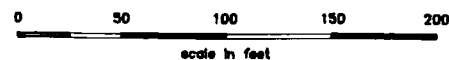
Map 1: ACC Treatment Facility Area

Map 2: ACC Landfill



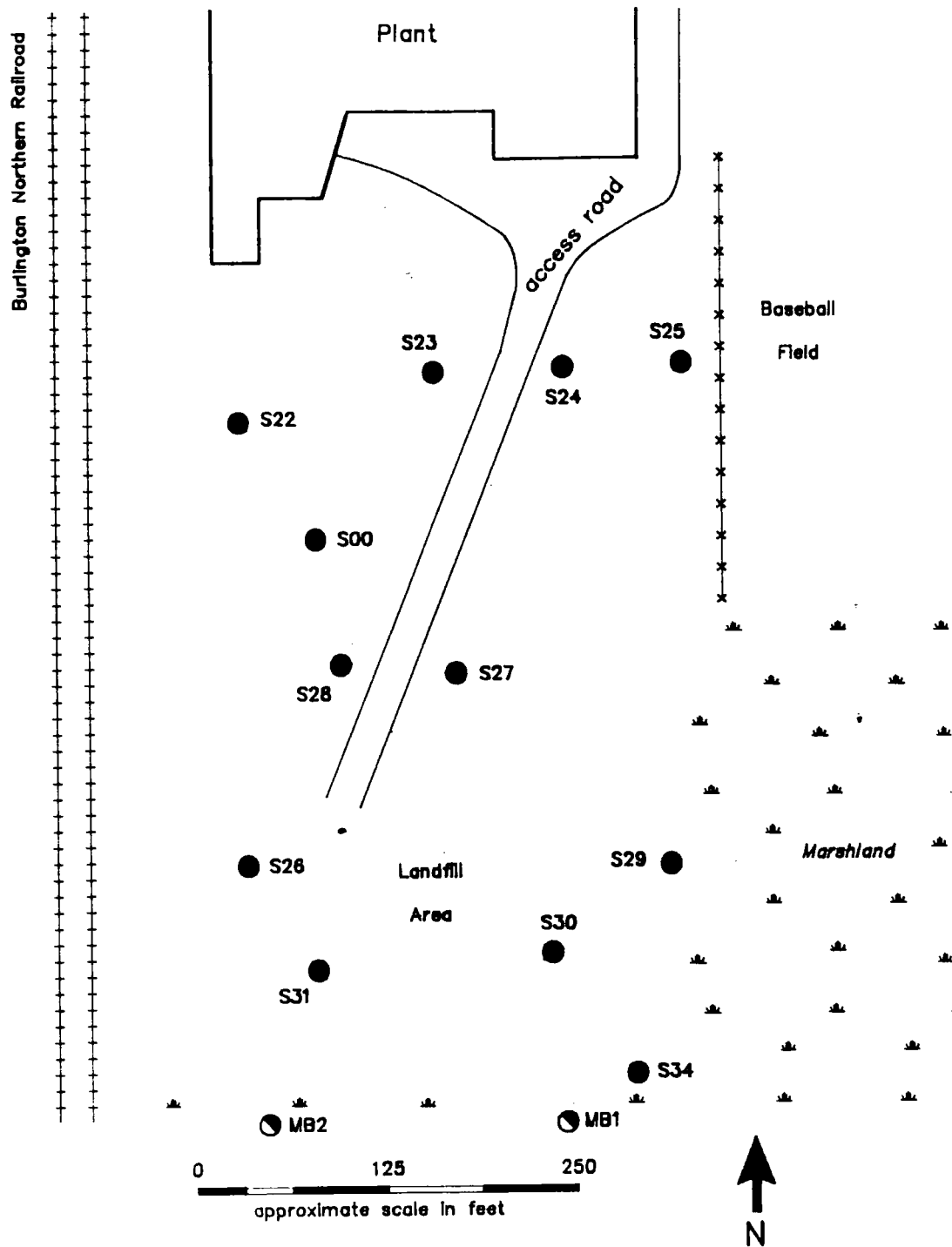
LEGEND

- EPA chain-link fence
- Minute-man boring
- Hollow-stem auger boring
- Cement pad



ecology & environment, inc.	
Job: T10-8708-028	Waste Site: TWAC087
Drawn by: D. P.	Date: Jan. 11, 1988

MAP 1
TREATMENT FACILITY BORING
LOCATIONS WITH 25 FOOT GRID
SUPER-IMPOSED
 AMERICAN CROSSARM AND CONDUIT CC
 Chehalis, OR



LEGEND

- Landfill boundary
- Minute-man boring
- Hollow-stem auger boring

ecology & environment, inc.

Job: F10-8708-028

Waste Site: TWA0067

Drawn by: D. P.

Date: Jan. 12, 1988

MAP 2
LANDFILL BORING LOCATIONS
 AMERICAN CROSSARM AND CONDUIT CO.
 Chehalis, WA

APPENDIX B

**Soil Boring Lithologic Description Logs
S-00 through S-38**

GEOLOGIC LOG

Boring No.: S-00 Logged By: J.B. Hunt
Project: American Crossarm Date Completed: October 23, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-3.5	3.5	FILL - Cobbles.
3.5-5.5	2	GRAVELLY CLAY - Dark green, clay; wood fragments and organic material; cobbles and gravel.
5.5-6	0.5	WOOD - Wood chips, some oily.
6-18	12	No recovery.

GEOLOGIC LOG

Boring No.: S-1 Logged By: G. Walker
Project: American Crossarm Date Completed: November 3, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-1.5	1.5	FILL - Sand and gravel.
1.5-2	0.5	GRAVELLY SILT - Dark brown, silt; well-rounded gravel; oil stained wood chips.
2-3	1	CLAY - Medium brown, silty clay; plastic.
3-3.5	1.5	CLAYEY GRAVELLY SAND - Brown and pale green, very fine sand; <10% clay and gravel; slightly plastic.
3.5-6	2.5	CLAYEY SAND - Grey, silty, fine sand; plastic; oil present.
6-15	9	SANDY CLAYEY GRAVEL - Sub-rounded to well-rounded gravel; grey green to medium brown silty clay; fine to very coarse sand; oil present.
15-16.5	1.5	CLAY - Grey green, silty clay; highly plastic.
16.5-17.5	1	SANDY GRAVELLY CLAY - Grey to brown, clay; coarse sand and gravel.
17.5-25.5	8	SANDY GRAVEL - Sub-angular to well-rounded gravel; orange to gold, brown to medium brown, fine to coarse sand.
25.5-27	1.5	No recovery.

GEOLOGIC LOG

Boring No.: S-2 Logged By: G. Walker
Project: American Crossarm Date Completed: October 28, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-0.5	0.5	ASPHALT
0.5-7.5	7	CLAY - blue green - dark green-brown, silty clay; slightly plastic; organic material in places.
7.5-11	3.5	CLAYEY SANDY GRAVEL - Angular to well-rounded, poorly sorted, gravel; yellow brown - dark brown, silty, clayey, fine sand; FeO staining in places.
11-15	4	SAND - Fine to medium, brown, sand.
15-18	3	SANDY GRAVEL - Small to medium gravel; medium brown, very fine to medium sand; oil sheen.
18-20.5	2.5	CLAY - Silty, red brown - yellow, clay; plastic; some very fine to fine sand.
20.5-26.5	6	SANDY GRAVEL - Angular to well-rounded, poorly sorted to well sorted, <2", gravel; orange brown - red brown, fine to medium sand; minor amounts of silt and clay.

GEOLOGIC LOG

Boring No.: S-3 Logged By: M. Geraminegad
Project: American Crossarm Date Completed: October 27, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-0.5	0.5	ASPHALT
0.5-3.5	3	No recovery.
3.5-4	0.5	SANDY CLAY - Dark brown, silty, sandy clay.
4-15	11	CLAYEY GRAVELLY SAND - Yellowish brown, silty, fine to coarse sand; <10% clay and gravel.
15-16	1	SAND - Reddish brown, fine sand.
16-18.5	2.5	No recovery.
18.5-19.5	1	CLAY - Brown, silty, clay; highly plastic.
19.5-26.5	7	SANDY GRAVEL - Gravel; brown, silty, fine to coarse sand.

GEOLOGIC LOG

Boring No.: S-4 Logged By: G. Walker
 Project: American Crossarm Date Completed: November 5, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-1.5	1.5	FILL - Gravel pad.
1.5-4	2.5	CLAY - Grey to green, silty clay; very plastic; oily wood chips in places.
4-6	2	SILTY SAND - Dark brown, fine sand and silt; organic material.
6-7.5	1.5	SANDY SILTY CLAY - Grey, silty, clay; fine sand; wood chips; oil present.
7.5-12	4.5	SANDY CLAYEY GRAVEL - Sub-angular to sub-rounded, gravel; <10% clay; gold to brown fine to coarse sand; till-like.
12-14.5	2.5	SANDY GRAVEL - Well-rounded, well sorted gravel; gold to brown, medium to coarse sand.
14.5-18	3.5	SANDY CLAYEY GRAVEL - Angular to rounded gravel; <10% silt and clay; gold to brown, medium to coarse sand.
18-18.5	0.5	SAND - Brown, medium to coarse, well sorted, well-rounded sand.
18.5-19.5	1	SANDY CLAY - Orange to red, clay; <10% very fine sand; plastic.
19.5-22.5	3	CLAYEY SAND - Orange brown to brown, fine sand; clay.
22.5-25.5	3	SANDY GRAVEL - Sub-angular to sub-rounded, gravel; brown, coarse sand.
25.5-27	1.5	No recovery.

GEOLOGIC LOG

Boring No.: S-5 Logged By: G. Walker
Project: American Crossarm Date Completed: October 28, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-0.5	0.5	ASPHALT
0.5-1	0.5	SANDY CLAY - Dark brown, silty clay, very compact.
1-2	1	SANDY GRAVELLY CLAY - Green-brown, silty clay; <10%, fine sand and angular rock fragments, FeO staining.
2-4.5	2.5	CLAYEY SAND - Dark brown, silty, fine to medium sand; <10% clay; some organic matter; green staining in places.
4.5-13.5	9	SANDY GRAVEL - Poorly sorted, angular to well-rounded, <2", gravel; orange-gold brown, medium-coarse sand; FeO staining in places.
13.5-14.5	1	SAND - Brown, fine to medium, sand; FeO staining in places.
14.5-15.5	1	SANDY GRAVEL - Gravel; orange brown, fine to very coarse sand; <10% silt.
15.5-22.5	7	No recovery.

GEOLOGIC LOG

Boring No.: S-6 Logged By: G. Walker
Project: American Crossarm Date Completed: October 28, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-0.5	0.5	ASPHALT
0.5-13.5	13	CLAYEY SANDY GRAVEL - Angular to well-rounded gravel; orange-brown, medium-very coarse sand, with gradations to fine white sand about 1/2" thick; clay, FeO and black staining in places.
13.5-15.5	2	No recovery - SAND?

GEOLOGIC LOG

Boring No.: S-7 Logged By: M. Geraminegad
Project: American Crossarm Date Completed: October 27, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-0.5	0.5	ASPHALT
0.5-1	0.5	SANDY GRAVEL - Brown, silty sand and gravel.
1-3	2	SANDY GRAVELLY CLAY - Dark brown, silty clay; <10% sand and gravel.
3-16	13	SANDY GRAVELLY CLAY - Clay, yellowish brown silty; gravel; fine to coarse sand (competent-till like).
16-19.5	3.5	SAND - Reddish brown to brown, fine to medium sand.
19.5-20	0.5	CLAYEY SANDY GRAVEL - Gravel; brown, silty fine to coarse sand; minor clay.

GEOLOGIC LOG

Boring No.: S-8 Logged By: G. Walker
Project: American Crossarm Date Completed: October 28, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-0.5	0.5	ASPHALT
0.5-3	2.5	CLAY - Dark grey-green, silty clay; slightly plastic.
3-8.5	5.5	SANDY GRAVELLY CLAY - Gold-brown, silt and clay, FeO staining; <10% coarse sand and poorly sorted gravel, angular to well rounded; (competent-till like); black staining in places.
8.5-14.5	6	SANDY GRAVEL - Poorly sorted, angular to well-rounded, gravel; orange-brown, medium to coarse sand; <10% silt.

GEOLOGIC LOG

Boring No.: S-10Logged By: M. GeraminegadProject: American CrossarmDate Completed: November 2, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-0.5	0.5	FILL - Brown, fine to coarse sand.
0.5-1.5	1	SANDY GRAVELLY CLAY - Dark brown, silty clay; <10%, sand and gravel; wood chips.
1.5-3	1.5	SANDY CLAY - Yellowish brown, silty clay; <10%, fine sand.
3-14.5	11.5	GRAVELLY SAND - Yellowish brown to brown, silty, fine to coarse sand; gravel.
14.5-16.5	2	CLAYEY SANDY GRAVEL - Gravel; <20%, sand; yellowish brown, clay.
16.5-28.5	12	No recovery.

GEOLOGIC LOG

Boring No.: S-11 Logged By: G. Walker
Project: American Crossarm Date Completed: November 4, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-1.5	1.5	FILL - Gravel pad.
1.5-3	1.5	No recovery.
3-5.5	2.5	SANDY CLAY - Medium brown, silty clay; slightly plastic; fine sand.
5.5-22	16.5	CLAYEY SANDY GRAVEL - Poorly sorted, sub-angular to well- rounded gravel; medium to coarse sand; orange to dark brown, silty clay.
22-23.5	1.5	GRAVELLY SAND - Brown, fine to very coarse sand; <10%, well-rounded, well sorted gravel.
23.5-25.5	2	No recovery.
25.5-27	1.5	SANDY GRAVEL - Sub-angular to well-rounded; gravel; reddish brown, fine to coarse sand.

GEOLOGIC LOG

Boring No.: S-12 Logged By: M. Geraminegad
Project: American Crossarm Date Completed: November 2, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-1.5	1.5	FILL - Brown, silty clay, fine to coarse sand, and gravel.
1.5-8.5	7	CLAYEY SANDY GRAVEL - 5-10%, yellowish brown to dark brown, silty, clay; 10-20%, fine to coarse sand; gravel.
8.5-11.5	3	No recovery - Void space or very soft material.
11.5-23.5	12	SANDY GRAVELLY CLAY - Brown to dark brown, silty clay; medium gravel; fine to coarse sand.

GEOLOGIC LOG

Boring No.: S-13 Logged By: M. Geraminegad
Project: American Crossarm Date Completed: October 30, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-1	1	CLAYEY SANDY GRAVEL - Dark brown silty clay; sand; gravel; plant material.
1-3.5	2.5	SANDY CLAY - Yellowish brown, silty clay; fine sand.
3.5-20.5	17	CLAYEY SANDY GRAVEL - Yellowish brown silty clay; fine to coarse sand; gravel.
20.5-21.5	1	CLAY - Yellowish brown, silty clay; laminated.
21.5-25.5	4	GRAVELY SAND - Greyish yellow to brown, fine sand; <10% gravel.
25.5-27.5	2	No recovery.

GEOLOGIC LOG

Boring No.: S-14 Logged By: G. Walker
Project: American Crossarm Date Completed: October 29, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-2	2	FILL - Silt, sand and gravel.
2-14.5	12.5	SANDY CLAYEY GRAVEL - Sub-angular to well-rounded gravel; clay and silt; gold brown - orange brown - dark brown, fine to medium, to coarse sand; FeO staining; (till like).
14.5-15	0.5	CLAY - Silty, medium brown, clay; minor amounts of fine sand; very plastic.
15-19.5	4.5	SANDY GRAVEL - Sub-angular to well-rounded, gravel; orange brown to medium brown, medium to very coarse sand.
19.5-21.5	2	SAND - Red brown, silty, fine sand; FeO staining.
21.5-25	3.5	SANDY GRAVEL - Sub-angular to well-rounded, <3", gravel; medium brown, fine to very coarse sand; FeO staining.
25-28.5	3.5	No recovery.
28.5-29	0.5	SAND - Medium brown, fine to very coarse, sub-rounded to rounded sand.

GEOLOGIC LOG

Boring No.: S-15 Logged By: G. Walker
Project: American Crossarm Date Completed: October 29, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-1.5	1.5	FILL - Sand, gravel, wood chips.
1.5-3.5	1.5	SAND - Dark brown, silty; fine sand.
3.5-19.5	16	GRAVELY SAND - Orange brown to gold brown, fine to medium sand; sub-angular to well-rounded gravel, black staining in places.
19.5-21	1.5	SAND - Medium brown, fine to medium sand; minor amount of silt; cross bedding patterns present.
21-27.5	6.5	SANDY GRAVEL - Sub-angular to well-rounded gravel; orange brown to brown, medium to coarse sand.

GEOLOGIC LOG

Boring No.: S-16 Logged By: M. Geraminegad
Project: American Crossarm Date Completed: October 30, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-1	1	CLAYEY SANDY GRAVEL - Brown silty clay; fine to coarse sand; fine gravel.
1-4	3	CLAY - Silty clay; black decomposed wood chips.
4-31	27	SANDY GRAVEL - Fine to coarse gravel; yellowish brown, silty, fine to medium sand; oil sheen through samples; till-like.

GEOLOGIC LOG

Boring No.: S-17 Logged By: J.B. Hunt
Project: American Crossarm Date Completed: October 16, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-2	2	FILL - Cobbles.
2-4	2	GRAVELLY SANDY CLAY - Yellowish brown.
4-8	4	SANDY CLAY - Grey blue, very plastic, homogenous, wood chips at 4-4.5 feet, some FeO staining.
8-26	18	GRAVELLY CLAYEY SAND - Light brown to reddish sand; some FeO staining; well sorted and poorly sorted, sub-rounded to rounded gravel and cobbles.

GEOLOGIC LOG

Boring No.: S-18 Logged By: J.B. Hunt
Project: American Crossarm Date Completed: October 16, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-2	2	FILL - Sand, gravel, and cobbles.
2-4	2	CLAYEY SAND - Brown sand; some FeO staining; some wood chips; 10% clay.
4-10	6	SANDY CLAY - blue green clay; oil stained wood chips in places; stringers of FeO staining.
10-14	4	GRAVELLY SANDY CLAY - Green clay; FeO staining in places; small cobbles.
14-27	13	CLAYEY SANDY GRAVEL - Poorly sorted and well sorted, sub-rounded to well-rounded 1-inch gravel; FeO staining in places; grey to green clay.

GEOLOGIC LOG

Boring No.: S-19Logged By: J.B. HuntProject: American CrossarmDate Completed: October 15, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-2	2	FILL - Sand, gravel, and cobbles.
2-12	10	SANDY GRAVELLY CLAY - Grey green clay; 10% sand; wood chips and organic material in places; cobbles.
12-14	2	GRAVELLY CLAY - Grey green clay; cobbles.
14-24	10	SANDY CLAYEY GRAVEL - Green to grey green clay; poorly sorted gravel; well sorted, coarse sand; FeO staining in places.

GEOLOGIC LOG

Boring No.: S-20Logged By: J.B. HuntProject: American CrossarmDate Completed: October 15, 1987

DEPTH (FEET)	THICKNESS	DESCRIPTION
0-2	2	CLAYEY SAND - 90%, dark brown sand; 10%, clay; some wood chips.
2-4	2	SANDY CLAY - Blue grey clay; some FeO staining; organic debris.
4-24	20	CLAYEY SANDY GRAVEL - Gravel; grey-green, coarse sand and clay; FeO staining in places; some organic material.
24-26	2	CLAYEY SAND - Well sorted, sub-rounded, fine sand grading to coarse sand; 10%, clay.

GEOLOGIC LOG

Boring No.: S-21Logged By: J.B. HuntProject: American CrossarmDate Completed: October 15, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-4	4	SANDY GRAVEL - Dark brown sand and gravel.
4-10	6	GRAVELLY CLAY - Green to blue or yellowish clay; gravel; some wood chips.
10-12	2	GRAVELLY SANDY CLAY - 60%, clay; orange brown, 40%, sand; FeO staining.
12-16	4	CLAY - Plastic, tan to green clay; some FeO staining.
16-20	4	GRAVELLY CLAYEY SAND - Orange brown.
20-21	1	SAND - Coarse, well sorted sand.
21-30	9	CLAYEY GRAVELLY SAND - 80%, orange brown sand; gravel; clay.

GEOLOGIC LOG

Boring No.: S-23 Logged By: M. Geraminegad
Project: American Crossarm Date Completed: October 27, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-1	1	SANDY GRAVEL - Gravel; brown, silty, fine to coarse sand.
1-3.5	2.5	SANDY GRAVELLY CLAY - Brown, silty clay; <10% sand and gravel.
3.5-5	1.5	SAND - Brown, silty, fine to coarse sand; wood fragments.
5-8.5	3.5	No recovery.
8.5-9.5	1	SANDY GRAVELLY CLAY - Greyish brown, silty clay; sand and gravel.
9.5-11.5	2	WOOD - Wood chips and fragments.
11.5-12	0.5	CLAY - Dark brown, silty clay; some wood chips.

GEOLOGIC LOG

Boring No.: S-24 Logged By: J.B. Hunt
Project: American Crossarm Date Completed: October 20, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-6	6	FILL - Oxidized soil and wood chips.
6-8	2	No recovery.
8-20	12	CLAY - Dark blue green clay; disseminated wood chips; FeO staining in places.
20-29	9	SILTY CLAY - Dark blue-green clay with interbedded silt.
29-30	1	CLAYEY GRAVEL - Gravel; dark grey, silty clay; minor cobbles.

GEOLOGIC LOG

Boring No.: S-25Logged By: J.B. HuntProject: American CrossarmDate Completed: October 22, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-4	4	FILL - Cobbles.
4-5	1	CLAY - Dark green, clay; organic material and wood throughout.
5-10	5	SANDY CLAYEY GRAVEL - Rounded, cobbles; olive green sandy, clay.
10.5-12	1.5	CLAY - Dark green, sandy clay; wood fragments throughout.
12-27	15	No recovery - some wood fragments recovered.

GEOLOGIC LOG

Boring No.: S-26 Logged By: J.B. Hunt
Project: American Crossarm Date Completed: October 22, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-3.5	3.5	FILL - Cobbles.
3.5-13.5	10	WOOD - Concrete, wood chips; some creosote type residue in places.
13.5-20	6.5	CLAY - Olive green, clay; homogenous, black marbling.
20-28.5	8.5	SANDY CLAY - Grey green to army green to brown, clay; silt and sand interbedded.
28.5-29.5	1	CLAYEY SANDY GRAVEL - Well sorted, rounded gravel; sand; light green clay.

GEOLOGIC LOG

Boring No.: S-27 Logged By: J.B. Hunt
Project: American Crossarm Date Completed: October 21, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-3	3	FILL - cobbles and oxidized soil.
3-4.5	1.5	CLAY - Olive green clay.
4.5-8	3.5	SANDY GRAVELLY CLAY - Olive green clay; cobbled gravel; sandy pockets with FeO staining.
8-18.5	10.5	WOOD CHIPS - Wood debris, creosote odor in places.
18.5-29	10.5	CLAY - Olive green to dark blue green clay; plastic; FeO staining between 18.5-20 feet.

GEOLOGIC LOG

Boring No.: S-28 Logged By: J.B. Hunt
Project: American Crossarm Date Completed: October 23, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-3.5	3.5	FILL - Cobbles.
3.5-5.0	1.5	CLAY - Dark green, clay; wood fragments throughout.
5-10	5	SANDY CLAYEY GRAVEL - Rounded, cobbles; olive green sandy, clay.
10-18.5	8.5	No recovery - some wood fragments recovered.
18.5-28.5	10	SANDY CLAY - Dark olive green, sandy clay; mottled with FeO homogenous.
28.5-33.5	5	CLAY - Grey blue to dark green, homogenous.
33.5-35	1.5	CLAYEY SANDY GRAVEL - Gravel, poorly sorted, sub-rounded, cobbles; well sorted, well-rounded, coarse sand; blue grey clay.

GEOLOGIC LOG

Boring No.: S-29Logged By: J.B. HuntProject: American CrossarmDate Completed: October 20, 1967

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-4	4	FILL - Cobbles.
4-14	10	CLAYEY SAND - Red brown to grey green, FeO staining, sand; clay; wood chips.
14-26	12	CLAY - Grey green clay; competent, plastic.
26-32	6	SANDY CLAY - Dark blue green clay; silt and sand.

GEOLOGIC LOG

Boring No.: S-30 Logged By: J.B. Hunt
Project: American Crossarm Date Completed: October 17, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-4	4	FILL - Sand and gravel.
4-8	4	SANDY GRAVEL - Dark brown sand and gravel.
8-20	12	CLAY - Dark green clay, plastic, FeO stringers; wood debris at 8-8.6 feet.
20-27	7	SANDY CLAY - Dark green clay; 20-40% sand.
27-38	11	GRAVELLY SANDY CLAY - Blue green sand and clay; 1/2"-1" poorly sorted cobbles.
38-40	2	CLAYEY SAND - 70%, coarse sand; 30%, clay; charcoal grey.
40-43.5	3.5	SANDY SILT - Charcoal grey, indurated sand and silt.

GEOLOGIC LOG

Boring No.: S-31 Logged By: J.B. Hunt
Project: American Crossarm Date Completed: October 21, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-3.5	3.5	FILL - Cobbles.
3.5-10	6.5	SANDY GRAVELLY CLAY - Green brown to green grey, sandy clay; cobbles and asphalt-like material.
10-10.5	0.5	CLAY - Olive green, clay; plastic, some FeO staining.
10.5-14	3.5	No recovery.
14-20	6	CLAY - Same as 10-10.5.
20-29	9	SANDY CLAY - Olive green, homogenous, sandy clay.
29-33	4	SANDY CLAYEY GRAVEL - Poorly sorted; well-rounded, <2" gravel; dark grey sand and clay matrix.
33-37.5	4.5	No recovery.

GEOLOGIC LOG

Boring No.: S-34 Logged By: J.B. Hunt
Project: American Crossarm Date Completed: October 19, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-4	4	FILL
4-8	4	GRAVELLY SANDY CLAY - Tan to green.
8-20	12	SANDY CLAY - Olive green sand and clay; FeO staining in places.
20-26	6	SANDY CLAYEY GRAVEL - Gravel; blue grey sandy clay; large cobbles.

GEOLOGIC LOG

Boring No.: S-37Logged By: G. WalkerProject: American CrossarmDate Completed: November 4, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-1.5	1.5	FILL - Gravel pad.
1.5-3	1.5	No recovery.
3-4.5	1.5	SILTY SAND - Dark grey, fine to medium, silty, sand; wood chips and organics (<10%).
4.5-7.5	3	GRAVELLY SAND - Orange to brown, silty, fine sand; sub-angular to rounded gravel; black staining in places.
7.5-24	16.5	SANDY GRAVEL - Sub-angular to well-rounded gravel; gold to orange, medium to coarse sand.
24-27	3	No recovery.

GEOLOGIC LOG

Boring No.: S-38 Logged By: M. Geraminegad
Project: American Crossarm Date Completed: November 2, 1987

DEPTH (Feet)	THICKNESS	DESCRIPTION
0-0.5	0.5	ASPHALT
0.5-3	3	FILL - Dark brown, silty, clay, fine to coarse sand.
3-5.5	2.5	GRAVELLY SANDY CLAY - Yellowish brown, silty clay; fine to coarse sand; <10% gravel.
5.5-13.5	8	No recovery.
13.5-15	1.5	CLAYEY GRAVELLY SAND - Brown, silty, fine to medium sand; <10% gravel and clay.
15-18.5	3.5	No recovery.
18.5-20	1.5	CLAY - Yellowish brown, silty clay.
20-23.5	3.5	No recovery.
23.5-32	8.5	CLAYEY SANDY GRAVEL - Brown, medium gravel; <10% clay and sand.